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ABSTRACT

To differentiate student creativity by various tasks, the investigator used two classes with many minority-group students for whom certain admission requirements had been waived. In lieu of final exam, 17 experimental (Minority) and 28 control students received tests of creative thinking. Two forms were used, each with three separate figural tasks. The first form presented a circles, a triangles, and a squares task; the second, circles, squares, and then triangles. The first two tasks were timed, the third was not. All were scored for fluency, flexibility, and originality, and the timed and untimed tasks compared. Except for a few individual experimental subjects, the controls were much higher on all counts. Comparison of originality scores in the timed and untimed tasks showed erratic differences in individuals in both groups, indicating a group rather than a task difference. Though inconclusive, the study highlights the lack of screening for the minority group, their possible anxious reaction to testing, and their lack of broad background, in contrast to the screened and generally able students of the dominant culture; it suggests identifying creativity in the disadvantaged in early school years. In short, comparisons between culturally different groups showed wide and unpredictable individual differences; the dominant culture has an advantage over the minority; an untimed task gave no anxiety relief to the disadvantaged; general education for minority cultures must be maximized. (HH)

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TIMED AND UNTIMED TESTS OF CREATIVE THINKING:

A TIMELY COMPARISON

by

Berenice D. Bleedorn

As higher education begins to adjust itself to the influx of larger numbers of minority-group students, implications for many parts of the educational system become obvious. After years of complacency, college teachers, counselors, and administrators are coming to realize that conventional techniques and methods are not universally valid; that existing processes and structures may not be immutably fixed; and, above all, that modes of evaluating and predicting academic potential -- designed for the most part on the basis of traditional assumptions -- are not to be taken for granted. As student populations grow more heterogeneous, educational researchers are finding it necessary to develop alternate ways of measuring academic potential and educational achievement. Pioneers in pointing out one direction of change are those in the academic community who have, in the last few years, been engaged in investigations intended to define and measure human creative capacties. A report on a project delving into one aspect of student creativity as it is related to academic learning comprises this issue of The General College Studies.

Teachers and researchers in the General College share a tradition of interest in the subject of creativity. Readers of this publication may recall that several issues of it in the past (Volume I, Numbers 1, 2, 3) were devoted to reports of efforts to measure student creative ability and to distinguish it from skills and aptitudes usually regarded as more strictly academic. In this report, Professor Bleedorn recounts her attempt to differentiate student performance on various tasks of creativity, using as the population of study two General College classes with substantial minority-group enrollments. Though, as in any study with a modest scope, any conclusions must be regarded as tentative, her findings do indicate the need for future study, and her project serves as an example of a kind of research that will have increasing significance in the future.

The author of this report is an instructor of GC 34: Creative Problem Solving, a regular part of the General College curriculum.

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TIMED AND UNTIMED TESTS OF CREATIVE THINKING

A TIMELY COMPARISON

by

Berenice D. Bleedorn

Identifying the creatively talented among minority cultures (Torrance, 1968; Douglas, 1969) is a matter of educational and social concern. There is considerable evidence that culturally disadvantaged students lack experience in school know-how and activities, and have styles of learning that differ from that of most students (Reisman, 1962). Since these differences may include an inability to respond positively to time pressures in a test situation, the identification of creatively talented students through a test of creative thinking might be made more culture-free, and the test itself might be a more valid measure of creative ability, if there were no limit of time for test tasks to be performed. It was hypothesized for this study that university freshmen of minority-culture backgrounds would compare more favorably with subjects of the dominant culture from the same educational level in an untimed task of creative thinking than they would in the usual ten-minute timed tasks, and that the difference between task scores in the untimed and timed situations would be relatively greater in the experimental group than in the control group.

Procedure: In 1968 students from minority groups were recruited to attend the University of Minnesota as participants in the scholarship program supported by funds contributed to the Martin Luther King Memorial and by other University of Minnesota student aid funds. Of the total number recruited, ninety-two were enrolled in the General College. Because of the special nature of this group of students, regular admission procedures were not adhered to and for many of them entrance examinations were not administered. The experimental group for this study was drawn from this "Martin Luther King" (MLK) population. Through the cooperation of the General College, a total of seventeen of these students were available for testing. All were Negro except for one Indian and two Mexican-American students. The control group numbered twenty-eight.

They were all members of the dominant racial group and regular General College freshman students at the University. They had been admitted through regular channels, including the requirement of a standard entrance examination. The tests of creative thinking were given at the end of the fall quarter, 1968. A natural combination of experimental and control subjects was available through the cooperation of instructors for GC 32A : Oral Communication* (2 sections) and GC 30A: Reading and Vocabulary Development** (1 section). MLK students in the General College had been given the option of registering for one of these two courses as an alternative to the tutorial required of all MLK students.

The tests of creative thinking were presented in lieu of a final examination to a total of forty-five subjects, seventeen experimental (MLK) and twenty-eight control (non-MLK) students. The tests were adapted for General College use from the "Minnesota Tests of Creative Thinking" and scored from the manual adapted by Amram and Giese (1966) from the Administration and Scoring Manual by E. Paul Torrance. Two different forms were used, each with three separate figural tasks. They were distributed randomly with an awareness of balancing experimantal and control subjects for each form. Form AG-C3 presented first a circles task, then a triangles task, and last a squares task. Form AG-C4 began also with the circles task, but reversed the order of the two remaining tasks. The question, "Do you believe that you are a creative person?" introduced the test.

In the administration of the test a deliberate effort was made to minimize anxiety by establishing a casual, comfortable climate. The first two tasks were timed at ten minutes each. For the third task the

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* The student is introduced to the basic principles of speech. By means of such assignments as an introduction, a demonstration, an argument, and a group discussion, he is given an opportunity to apply these principles. Through these classroom projects the student is helped to develop confidence in himself, to express his ideas clearly and effectively, and to listen critically.

**Reading films, slides, programmed learning texts, and reading and vocabulary exercises help the student enlarge his vocabulary, increase his reading speed, and expand his comprehension. Reading material varies from the level of the popular magazine to the college textbook. The student also learns how to use the dictionary efficiently. The course is not for students who need remedial work but for those who read with average ability. (Course descriptions, 1967-1969 General College Bulletin)

subjects were told they could have all the time they wanted to use. The three tasks in Form AG-C3 and AG-C4 were all scored for fluency, flexibility, and originality.

Results: A tabulation of scores for individual students was prepared (Tables I and II). Subjects for each form were listed in alphabetical order and designated by number, with a double asterisk to identify experimental subjects. Means and standard deviations for each of the three tasks in both forms were obtained (Tables III and IV). A comparison was made between the mean fluency scores on the identical timed (circles) task and the other timed (squares or triangles) task for each of the two groups -- experimental and control (Table V). A comparison was also made between the second and third tasks (timed and untimed) for each of the two groups -- experimental and control (Table V). The comparisons were repeated for scores on flexibility and originality (Tables VI and VII).

Comparing the two forms for the control (non-MLK) group seems to suggest that the two forms were essentially equal. Although the experimentals (MLK) taking AG-C4 were below those taking AG-C3, the difference was approximately equal for both the identical task (circles) and the two reversed tasks. This would seem to indicate a group difference rather than a test difference. A comparison of scores between MLK and non-MLK indicates a denial of the hypothesis (Tables III and IV). Not only did the control group achieve more appreciable gains in scores in the untimed task in both AG-C3 and AG-C4, but in all three dimensions of creative thinking -- fluency, flexibility, and originality -- mean scores for controls were consistently and startlingly higher than for experimentals. In the studies of comparison (Tables V, VI, VII), non-MLK subjects scored consistently better than MLK. Significant differences are indicated by asterisks (* = significant at .05 level; ** = significant at .01 level). Untimed test situations show gains consistently in favor of the control group.

It may be noted in the tabulation of individual scores (Tables I and II), that in several cases experimental subjects achieved scores considerably above the control mean figure. Evidence of factors influencing the experimental mean scores may also be noted. Two subjects in this group withdrew entirely from the test after the second task. Other ex-

tremes in performance are also in evidence.

To the question, "Do you believe that you are a creative person?", no consistent pattern seemed to emerge from the responses (Tables I and II).

Comparisons between scores of originality in the timed and untimed tasks suggest highly erratic relative differences in individual scores for both experimental and control subjects.

TABLE I. INDIVIDUAL SCORES ON TESTS OF CREATIVE THINKING, FORM AG-C3

Student No.	?	Task C			Task T			Task S		
		Flu	Flex	Orig	Flu	Flex	Orig	Flu	Flex	Orig
1	Y	8	6	22	11	11	23	15	11	35
**2	Y	22	15	56	27	22	68	18	15	23
3	Y	26	16	60	22	18	49	35	22	97
**4	Y	4	3	2	7	6	7	20	14	28
5	F	7	7	11	7	7	11	26	19	62
**6	Y	17	12	30	17	12	40	0	0	0
7	Y	15	11	33	23	17	43	33	22	70
8	F*	18	13	18	18	15	34	28	21	59
9	Y	17	12	49	17	16	26	35	24	93
**10	Y	31	20	55	7	7	14	27	15	59
11	Y	24	14	37	19	13	24	28	16	65
***12	N	11	11	20	7	5	7	20	14	47
13	F	11	8	20	12	8	13	31	22	67
14	Y	8	7	18	17	14	20	35	22	86
15	-	23	17	49	17	15	24	20	17	46
**16	Y	2	2	7	3	1	12	32	20	69
**17	Y	23	16	47	7	7	0	0	0	0
18	Y	33	16	45	14	11	31	33	20	56
19	N	16	13	33	12	10	18	34	24	66
**20	N	2	2	4	14	12	25	11	7	21
**21	N	10	9	23	9	9	18	13	11	23
22	Y	16	12	44	18	14	39	32	21	84
23	Y	4	2	12	4	2	15	11	8	25
24	N	10	7	17	6	6	7	9	8	15
**25	N	12	9	18	9	8	13	12	8	26

? = Question: "Do you believe that you are a creative person?"
Y = Yes; N = No; F = Fair; F* = Sometimes

** = Experimental subjects (MLK)

TABLE II. INDIVIDUAL SCORES ON TESTS OF CREATIVE THINKING, FORM AG-C4

Student No.	?	Task C			Task S			Task T		
		Flu	Flex	Orig	Flu	Flex	Orig	Flu	Flex	Orig
1	Y	10	9	16	13	11	24	26	20	61
2	F*	24	19	55	29	18	67	33	25	74
3	N	15	9	42	15	10	47	15	14	21
**4	Y	10	5	18	8	6	19	4	4	11
5	-	17	15	42	26	19	73	24	18	45
6	F*	20	16	31	19	17	34	34	18	88
**7	Y	4	4	16	6	6	19	11	8	29
8	Y	16	13	47	17	14	34	36	25	88
9	F	12	8	28	14	9	36	22	17	46
**10	Y	4	2	13	7	6	18	19	17	35
11	N	19	13	61	31	21	62	26	17	55
**12	F*	10	8	8	12	11	12	12	11	16
13	Y	31	21	69	21	17	38	25	17	48
14	-	19	15	47	10	8	21	29	20	65
**15	N	11	9	23	15	9	26	16	15	29
16	Y	25	16	30	20	15	37	23	18	42
**17	Y	7	6	25	8	5	22	6	4	16
18	Y	9	7	18	21	16	59	36	22	91
19	Y	12	9	22	12	9	31	23	20	33
**20	Y	6	4	21	5	3	15	6	5	9
21	Y	17	14	22	20	14	33	22	19	32
**22	F*	12	11	14	17	14	35	21	16	45
23	-	7	6	8	11	10	10	14	13	16
24	Y	8	7	20	8	7	13	15	13	26

? = Question: "Do you believe that you are a creative person?"

Y = Yes; N = No; F = Fair; F* = Sometimes

** = Experimental Subjects (MLK)

TABLE III. MEAN SCORES AND STANDARD DEVIATIONS FOR THREE TASKS OF CREATIVE THINKING (Timed and Untimed), Form AG-C3

	MLK			non-MLK		
Circles-Timed	N	mean	s.d.	N	mean	s.d.
Fluency	9	13.00	10.26	13	10.53	8.02
Flexibility	9	9.67	6.52	13	11.15	3.87
Originality	9	25.78	21.54	13	33.46	15.23
Triangles-Timed						
Fluency	9	10.00	7.00	13	15.38	5.19
Flexiblity	9	8.56	5,85	13	12.46	3.78
Originality	9	18.22	19.97	13	26.92	12.93
Squares-Untimed						
Fluency	9	17.00	9.42	13	25.54	11.27
Flexibility	9	11.56	5.85	13	17.23	6.98
Originality	9	32.89	21.43	13	59.69	29.37

TABLE IV. MEAN SCORES AND STANDARD DEVIATIONS FOR THREE TASKS OF CREATIVE THINKING (Timed and Untimed), Form AG-C4

	MLK			non-MLK		
Circles-Timed	N	mean	s.d.	N	mean	s.d.
Fluency	8	8.00	3.16	15	16.07	6.83
Flexibility	8	6.13	3.00	15	12.07	4.62
Originality	8	17.25	5.65	15	35.13	18.19
Squares-Timed						
Fluency	8	9.75	4.40	15	17.87	6.97
Flexibility	8	7.50	3.59	15	13.20	4.39
Originality	8	20.75	7.13	15	39.00	19.16
Triangles-Untimed						
Fluency	8	11.88	6.36	15	24.60	6.92
Flexibility	8	10.00	5.50	15	18.53	3.70
Originality	8	23.75	12.73	15	49.53	22.93

TABLE V. RESULTS OF COMPARISON OF MLK AND NON-MLK STUDENTS' SCORES OF FLUENCY

Form AG-C3

Mean:	Circles	Triangles	(Untimed) Squares	Difference Circles-Triangles	Difference Triangles-Squares
MLK	13.00	10.00	17.00	3.00	-7.00
Non-MLK	16.54	15.38	25.54	1.15	-10.15
t-value	.91	2.08	1.86	.48	.64

Form AG-C4

Mean:	Circles	Squares	(Untimed) Triangles	Difference Circles-Squares	Difference Squares-Triangles
MLK	8.00	9.75	11.88	-1.75	-2.13
Non-MLK	16.07	17.87	24.60	-1.80	-6.73
t-value	3.14*	2.98*	4.32*	.02	1.59

* = Significant at the .05 level of confidence

TABLE VI. RESULTS OF COMPARISON OF MLK AND NON-MLK STUDENTS' SCORES OF FLEXIBILITY

Form AG-C3

Mean:	Circles	Triangles	(Untimed) Squares	Difference Circles-Triangles	Difference Triangles-Squares
MLK	9.67	8.56	11.56	1.11	-3.00
non-MLK	11.15	12.46	17.23	-1.31	-4.77
t-value	-.67	-1.91	-2.00	1.04	.55

Form AG-C4

Mean:	Circles	Squares	(Untimed) Triangles	Difference Circles-Squares	Difference Squares-Triangles
MLK	8.13	7.50	10.00	-1.37	-2.50
non-MLK	12.07	13.20	18.53	1.13	-5.33
t-value	-3.27*	-3.14*	-4.45*	-.16	-1.44

TABLE VII. RESULTS OF COMPARISON OF MLK AND NON-MLK STUDENTS' SCORES OF ORIGINALITY

Form AG-C3

Mean:	Circles	Triangles	(Untimed) Squares	Difference Circles-Triangles	Difference Triangles-Squares
MLK	25.78	18.22	32.89	7.56	-14.67
non-MLK	33.46	26.92	59.69	6.54	-32.77
t-value	-.98	-1.25	-2.33*	.14	1.40

Form AG-C4

Mean:	Circles	Squares	(Untimed) Triangles	Difference Circles-Squares	Difference Squares-Triangles
MLK	17.25	20.75	23.75	-3.50	-3.00
non-MLK	35.13	39.00	49.53	-3.87	-10.53
t-value	-2.69*	-2.58*	-2.93	.05	.87

* = Significant at the .05 level of confidence

Discussion: There is no evidence in the data to support the hypothesis of this study. Tests of significance indicate that non-MLK students score higher in all three dimensions (fluency, flexibility, and originality) in each of the three tasks on both forms (AG-C3 and AG-C4). In each dimension (Tables V, VI, VII), differences between MLK and non-MLK for the AG-C4 form were significant on all three tasks, including the identical (circles) task. This would indicate a group difference rather than an influence of the reversed order of Tasks 2 and 3. Subjects using AG-C3 form showed significant difference only in Task 3 (Untimed Squares) in scores of originality (Table VII). The untimed tasks seem to consistently work more to the advantage of the non-MLK subjects, significantly in four out of six cases (Tables V, VI, VII).

Interpretations of the results of the study draw heavily on speculative facotrs. Because of the limited number of subjects, especially in the experimental group, generalizations are not strongly indicated. The surprisingly negative data from the experimental group scores might be rationalized by consideration of a number of factors:

1. The particular circumstances of the MLK population. The students were recruited from among minority 1968 high school graduates with little or no competitive screening procedures.
2. The anxiety produced by the testing situation. Students were all writing a "test" at the close of the fall quarter. The threatening quality of a first university "final", even though it was made clear that no grades were involved and no "right answers" indicated, could have had damaging effects, especially on disadvantaged youth with an accumulation of years of negative self-concepts.
3. Disparities in exposure to varieties of broadening and enriching experiences among socio-economically disadvantaged, compounded by the age of university freshmen, could exert limitations in responses and motivation to respond.
4. The control group of subjects were a cross-section of General College students who had been admitted according to regular channels, including an entrance

examination. In some cases General College students have considerable academic ability but have not developed a high school achievement record of a caliber to allow admission to the College of Liberal Arts or other colleges of the University.

Accordingly, the variables present in the situation suggest a variety of interpretations. There is present, however, a strong case for identification of creative talent among the disadvantaged at the preschool or early primary levels as recommended by Torrance.

Although according to these data, mean figures of fluency, flexibility, and originality in minority-culture freshmen students in the General College, 1968-69, ranked consistently and sometimes significantly below students of the dominant culture, individual scores offer clues for identifying superior creative thinking abilities in individual students.

A quality that seems to be shared by experimental and control subjects is the inconsistency of relationships between individual scores in timed and untimed tasks (Table VIII). Individual performances would seem to be governed by one or a number of personal variables.

Implications: For this sampling there is little evidence that tests of creative thinking would gain in "culture-fairness" by the use of untimed rather than timed tasks. It may be that timing is not a factor of sufficient significance to warrant further investigation. However, it might be of interest to discover possible differences in performance in an untimed task of creative thinking between other samples of the same two populations if the untimed task did not follow two like tasks with time limitations. There is some possibility that differences in motivation for the third in a sequence of three tasks so closely related affected the final (untimed) effort, particularly in the experimental group.

Summary: Within the limitations of the particular character of the instrument and the situation, this study clearly indicates for this particular sample:

1. the unpredictability and wide variation of individual performances in studies of comparison between

samples of culturally different groups;

2. the advantage of the sample drawn from the dominant culture over the minority-group sample in performance on tests of fluency, flexibility, and originality;
3. the failure of the removal of the pressures of time in the testing situation to serve as a comparative advantage to minority-group members;
4. the need for further studies of ways to maximize the effectiveness of general education for students of minority-culture backgrounds.

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